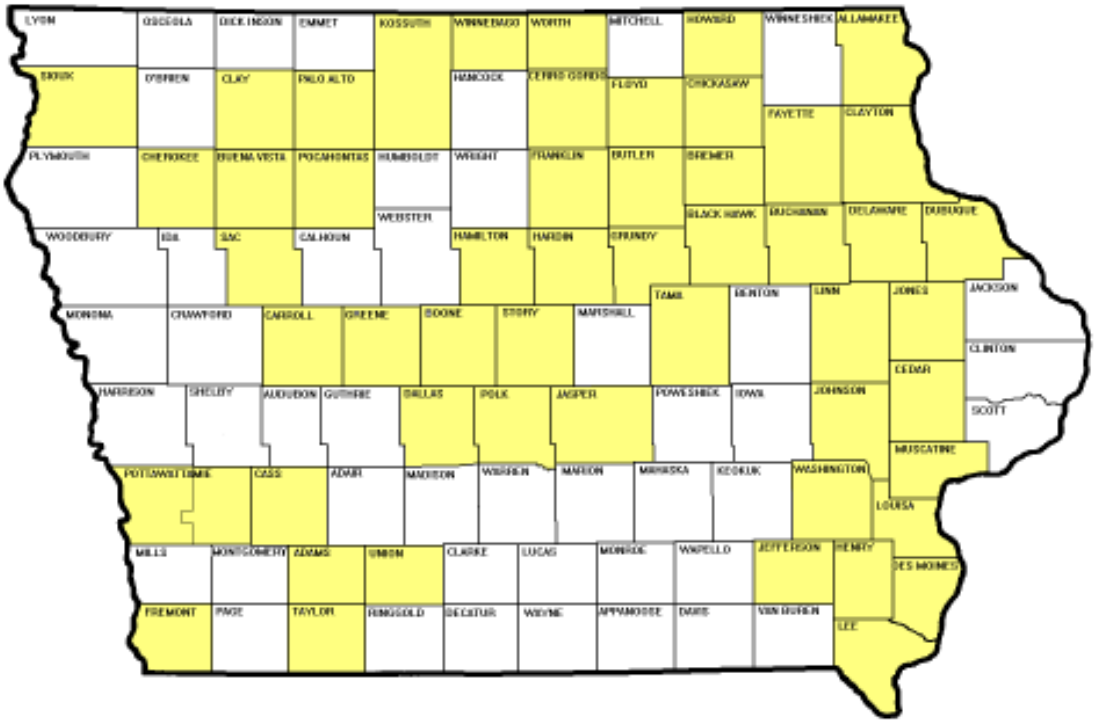
Integrated Farm/Livestock Management Demonstration Program

Crop Year 2004 Executive Summary



Demonstrations were established on more than 300 sites in CY-04.

Unique partnerships expand the financial and educational resources available to Iowa producers.

IFLM Program Overview

The Integrated Farm/Livestock Management (IFLM) Demonstration Program was created in 2000 as part of the Iowa Water Quality Initiative. This statewide program, administered by the Iowa Department of Agriculture and Land Stewardship, Division of Soil Conservation, concentrates on efficient management techniques in livestock and crop production systems in a demonstration/ education setting. It provides a valuable link between sound research and actual in-field application.

Working in cooperation with soil and water conservation districts, community colleges, Agribusiness Association of Iowa, Iowa Department of Natural Resources, Iowa Soybean Association, Iowa State University, and USDA National Soil Tilth Laboratory and Natural Resources Conservation Service, IFLM has formed unique partnerships with the realization that we achieve much more working together toward our common goals. These partners expand the financial and educational resources available to Iowa producers to address increasing environmental concerns.

Through Crop Year 2004, 36 projects have been funded through the IFLM program to demonstrating on hundreds of sites the effectiveness and adaptability of emerging agricultural systems for nutrient and pesticide management, water quality protection and soil conservation. Their ultimate goal is to change farming practices in Iowa, resulting in sustainable farm input management and environmental benefits including water quality and soil conservation.

The efforts of participating producers are being demonstrated to a widespread audience, through regional field days and tours and statewide forums. Information gained is being widely disseminated to producers, agribusiness, educators, researchers, and private and government agencies.

In Crop Year 2005, 6 IFLM projects are funded demonstrating tillage management, manure nutrient utilization, nitrogen and phosphorus management, and living mulch systems/cover crops.

Division of Soil Conservation
Tel: 515-281-0531
Fax: 515-281-6170
www.agriculture.state.ia.us

Hub and Spokes Model of Nutrient Management
Iowa State University

Tillage and manure management can have a significant impact on surface and ground water quality due to potential surface water runoff. An integrated approach of tillage and manure management is essential in developing best management practices for corn and soybean production. An integrated approach that utilizes both large scale field demonstrations and small scale research plots can provide a good understanding of the interaction effect of both tillage and manure management on the efficient use of nutrients and the potential impact on surface water quality. Also, the ability to obtain results from on-farm trials and research plots that are consistent, enable us to couple both concepts together to provide quality educational programs to producers and the agribusiness industry. Therefore, the major goal of this project was to demonstrate tillage and manure best management strategies on large field-scale demonstrations as well as small-scale research plots. The strategy for this project was to conduct on-farm demonstrations in several counties in northeast Iowa and on the ISU Research and Demonstration Farm in cooperation with the Northeast Iowa Agricultural Experimental Association. This is the "Hub and Spokes" concept, a participatory education model that was used as a foundation for education and outreach programming activities.

By addressing tillage and manure management using an integrated approach, nitrogen utilization can be more efficient.

At the Northeast Research Farm (Hub), evaluations of liquid swine manure and commercial fertilizer were established over three tillage systems consisting of no-tillage, conventional tillage, and fall strip-tillage. Manure and commercial nitrogen fertilizer rates (0, 75, 150, and 225 lb N/acre) were applied over each tillage system. The tillage and nitrogen rates were replicated three times. Measurements of tillage and nitrogen rate effects on corn yield response and nitrogen utilization were measured.

At the Spokes sites, 16 cooperators established 38 on-farm demonstrations to evaluate the effect of different rates of liquid swine manure on corn production and nitrogen utilization. For each demonstration site the manure applicators were calibrated to determine or check the application rates. Four total nitrogen rates of manure (0, ½ agronomic, full agronomic, and 1½ times the agronomic nitrogen rate in lb/acre) were applied at each demonstration site in three replications.

The results from both the on-farm demonstrations and the research farm show similar trends. Initial soil sample analysis show greater variability at the 0-6 inch depth than at the 6-12 in depth for total nitrogen, phosphorus, and potassium. For individual on-farm sites, applying manure using book values could result in a 63%, 79%, and 66% over or under application based on total nitrogen, phosphorus, and potassium, respectively. In all years, the late spring soil nitrate concentrations increase with an increase of total nitrogen applied, however there was considerable variability. In 2002, 2003, and 2004, 26 sites showed an excess of nitrate concentrations in the corn stalks greater than 2000 ppm. Of these 38 sites, 12 sites have corn stalks with excessive nitrate nitrogen concentration at the agronomic applied nitrogen rate and 14 sites at the high nitrogen application rate. Yield responses at both the hub and spokes sites varied due to site-specific conditions, weather conditions, soil variability, and past manure history. At the research site, neither tillage system nor nitrogen source showed significant differences in corn yield. Across all sites, the averages of economic optimal nitrogen rate were 192, 164, and 222 lb N/acre and the economic optimal grain yields were 196, 183, and 188 bu/acre in 2002, 2003, and 2004, respectively.

An important educational multiplier was the use of project information in outreach and education programs related to tillage and manure management such as field days, workshops, clinics, conferences, newsletters, print media, web page, and publications. Information gained from the project was delivered to farmers, agribusinesses, certified crop advisors, and agency personnel in over 40 project meetings, conferences, and extension education programs reaching an audience of over 2,900 attendees.

Contact: Dr. Mahdi Al-Kaisi, 2104 Agronomy Hall, Ames, IA 50011, Tel: 515-294-1923, malkaisi@iastate.edu

In-Season Nitrogen Management Strategies for Corn

Iowa State University Iowa State University

The goal of this project is to demonstrate emerging in-season nitrogen (N) management strategies that have potential to improve N use and economic return to corn production in Iowa.

The objectives of this project are: one, demonstrate use of corn plant N stress monitoring to determine need and rate of in-season N application and effect on corn yield; two, demonstrate the effect of set preplant or early-sidedress N rates (pre-applied N) on corn plant N sufficiency and N stress development, frequency and rate of needed in-season N application, total fertilizer N applied, and corn yield; and three, compare corn yield response and economics of using pre-applied N rates versus pre-applied plus in-season N applications.

The strategy for this project is to conduct on-farm field demonstrations with concurrent data collection to document corn yield response to N application rates and timing. In 2004 (year one of the project) 10 corn after soybean demonstration sites were established in nine counties. Field-length N treatment strips were randomized and replicated three times. Set pre-applied N rates are either fall- or spring-applied preplant or early-sidedress (hereafter referred to as pre): 1) a no-N control; 2) reference N rate at 240 lb N/acre (corn after soybean) or 270 lb N/acre (corn after corn); 3) reduced N rate at 60 lb N/acre (corn after soybean) or 90 lb N/acre (corn after corn); 4) agronomic N rate at 120 lb N/acre (corn after soybean) or 180 lb N/acre (corn after corn). In-season N applications vary and are determined from corn plant N stress sensing at the V15-VT vegetative growth stages: 5) reduced pre N rate (see number 3 for rate) plus in-season N applied near R1 corn growth stage (applied if needed and rate determined from corn plant sensing); and 6) agronomic pre N rate (see number 4 for rate) plus in-season N applied near R1 corn growth stage (applied if needed and rate determined from corn plant sensing). The in-season fertilizer N source is UAN solution surface-dribbled or coulter-injected with high-clearance equipment. All other field activities were completed as normal by the cooperator, including grain harvest of the application strips.

At all 2004 demonstration sites corn yield increased with N application (relative to the no-N control). Corn yield response to increasing the pre N rate from 60 to 120 lb N/acre was statistically significant (*P* d" 0.10) at eight of 10 demonstration sites. At nine of 10 demonstration sites the pre N rate of 120 lb N/acre produced top yields, or yields that were statistically similar to the 240 lb N/acre reference rate. From plant N stress sensing, in-season N rates were applied in addition to the 60 lb N/acre pre rate at nine demonstration sites. Corn yield response to this in-season N application was statistically significant at only four sites. The 120 lb N/acre pre rate produced yields that were statistically higher than the 60 lb N/acre pre plus in-season application strategy at six of the nine sites where in-season N was applied. At two sites, in-season N was applied in addition to the 120 lb N/acre rate as determined from plant N stress sensing. This in-season N increased yield at both sites.

Generally the project achieved its objectives in 2004. Wet field conditions in late May limited the total number of demonstration sites established in 2004. Field signs indicating the project name, program, and cooperating organizations were located at many sites in 2004. In early September, a field day attended by 45 local farmers and seed producers was held at our Shelby County-NW demonstration site. Since November 2004 the project leader has made presentations integrating results of this project to over 1800 people at 22 ISU Extension and agribusiness meetings.

In-season nitrogen management strategies have the potential to improve N use and economic return to corn production.

Contact: Dr. John E. Sawyer, 2104 Agronomy Hall, Ames, IA 50011, Tel: 515-294-1923, jsawyer@iastate.edu

Living Mulch Systems for Grain Crop Production
Iowa State University

Incorporation of perennial legumes into our row cropping systems and reduction of tillage will reduce soil erosion and concurrent loss of phosphorous and nitrogen to the surface water. Reducing erosion is particularly important in the Driftless Area in northeast Iowa where current crop production practices have been identified as a major contributor to the decline in surface water quality and are linked to hypoxia in the Gulf of Mexico. Our objective is to demonstrate that corn and soybean can be grown in a kura clover (*Trifolium ambiguum* M. Bieb.) living mulch system while maintaining yields of the current production systems. This system offers great opportunities to reduce environmental contamination, tillage, and nitrogen fertilizer inputs in conventional corn/soybean rotations and will, therefore, benefit all residents of Iowa.

The living mulch system offers great opportunities to reduce environmental contamination and tillage and nitrogen fertilizer inputs.

The 2004 crop year was the first of four years of this project. The strategy for this project is to conduct on-farm demonstrations at sites that encompass a range of soil characteristics and crop management practices. Six cooperators established the six kura clover fields successfully. Each collaborator received a "Field Book Manual" that described everything about kura clover and the project that they are participating in. It had all details that they needed for the first year of establishment. Sites were established in Grundy, Floyd, Butler, Bremer, and Cerro Gordo counties.

Kura clover has a weak seedling and it is difficult to establish. It is said that kura clover "sleeps in the first year, creeps in the second year, and leaps in the third year". We will, therefore, first be able to demonstrate intercropping of corn and soybean in the kura clover living mulch in the third and fourth year. Year 1 (2004) and year 2 (2005) will used to establish the kura clover fields. However, after the establishment of the kura clover, the fields will be available for demonstration for many years.

Soil samples were taken prior to planting to determine soil organic matter, pH, nitrogen, potassium, phosphorus, soybean cyst nematode, and weed seeds determination prior to this living mulch system. Biomass samples were taken from each site in October 2004 to determine protein, nitrogen, fiber/lignin and digestibility during the establishment year.

Overall, the project achieved its objectives and exceeded expectations for the first year. In corporation with the site cooperator, Iowa Department of Agriculture and Land Stewardship personnel and Iowa State University, an outreach field day was attended by 30 individuals. A workshop was hosted at the North Iowa Area Community College with attendance of 58 agency personnel, area producers and students from Iowa, Minnesota, and Wisconsin was also hosted. Information on the project was presented during the 2005 Agriculture and the Environment Conference where 216 participants had registered. In addition, two extension publications will be written this year.

The following website is dedicated to kura clover:
http://extension.agron.iastate.edu/soybean/production_kuraclover.html
These presentations are available there:
1. Growing Kura Clover Forage in Iowa.
2. Utilizing Kura Clover in Pastures for Beef and Milk Production.
3. Corn Production in Kura Clover Living Mulch.
4. Soil Erosion - What Will the Future Bring?
5. Conservation Tillage and Cover Crops.
6. Living Mulches - A Pest Management Tactic?

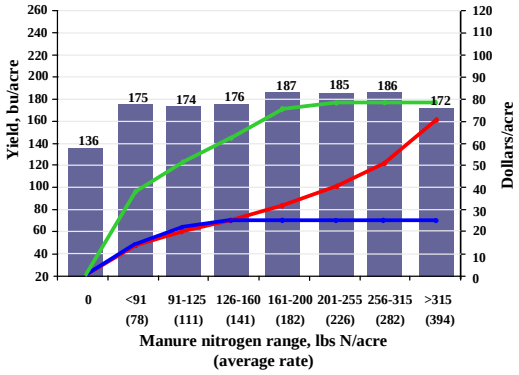
Contact: Palle Pedersen, 2104 Agronomy Hall, Ames, IA 50011, Tel: 515-294-1923, palle@iastate.edu

Manure Phosphorus Management
Iowa State University

Livestock-intensive farms in eastern Iowa are potential high-environmental impact farms that can profitably use on-farm nutrients. Improved accounting of manure nutrients will reduce the need for full rates of commercial fertilizers to be applied to row-crop fields. Reductions in commercial fertilizer applications and more efficient use of on-farm nutrient sources should ultimately reduce the risk of non-point pollution to the local natural resources. In cooperation with eastern Iowa farmers this project established on-farm demonstrations of nutrient management and utilization from manure and fertilizer sources that reduce pollution risks on eastern Iowa livestock and crop farms. The demonstrations, conducted along with information and educational programs, were designed to be locally applicable to a majority of producers throughout eastern Iowa.

Reaching the goal of increasing producer confidence in manure utilization for crops based on phosphorus and nitrogen content is essential to the project's success. The more confidence producers have in understanding their soil tests, plant tissue analyses, economic optimum fertility rates and on-farm nutrient resources, the better they can manage nutrient inputs from both a production and a regulatory standpoint.

Early field demonstrations show that many livestock and crop producers can benefit from refining manure and commercial nutrient use on their farms. While conducting their nutrient management field demonstrations, livestock producers are applying lower, P-based, manure rates to show that spreading valuable on-farm nutrients on greater acreages reduces the need for commercial fertilizers. At the same time, crop producers are demonstrating that they can refine nitrogen application rates by evaluating their nitrogen management through performance-based nitrogen management measures.



Cooperators have shown in their demonstrations that to use manure efficiently it is important not to apply manure at excessive rates and to target manure applications to fields testing optimum or lower for phosphorus (P) and potassium (K). The chart shows the cost to apply manure, the value of manure applied to high P/K testing fields, and the value of manure applied to optimum or lower P/K testing fields.

Improved accounting of manure nutrients will reduce the need for full rates of commercial fertilizers to be applied to row-crop fields.

Contact: Dr. Gerald A. Miller, 132 Curtiss Hall, Ames, IA 50011, Tel: 515-294-4333, soil@iastate.edu

Nitrogen and Phosphorus Utilization in Poultry Manure
Iowa State University

Poultry manure can be used to supply nutrient needs of crops in Iowa, but there are major uncertainties about its management, crop availability of nitrogen (N) and phosphorus (P), and application impacts on water quality. This three-year project began in 2004 and is designed to learn more about these issues by working together with producers and custom manure applicators. Project objectives are to implement field demonstrations to compare corn yield response to poultry manure and commercial fertilizer, estimate manure N and P availability, alleviate producers' uncertainty concerning supplemental fertilization needs when poultry manure is applied, measure soil nutrient responses to manure application, and evaluate potential manure N and P losses through surface runoff immediately after manure application. The project also will provide opportunities for educating producers, manure applicators, and others through personal contacts, field days, winter meetings, and a variety of educational materials.

Results show that reasonable precision in manure nutrient application rates is possible by using manure nutrient analysis and careful spreader calibration.

The general strategies involve conducting on-farm demonstrations and collecting data needed to document poultry manure N and P availability to corn, changes in soil-test values, and nutrient loss with surface runoff. In 2004, six demonstrations were established with cooperators in Bremer, Clay, Hamilton, Palo Alto, and Union counties. The project directly involved more than 30 other producers, manure applicators, manure brokers, or consultants from 15 other counties. Long and narrow strips replicated across each field were used to evaluate no manure application and manure applied at two rates using calibrated producers' or custom applicator's equipment. The high manure rate was planned to supply at least the N need of corn according to current recommendations, and always applied more P than needed by corn. The low rate was approximately one-half the high rate, and applied less to adequate amounts of N and P. In small areas of the strips, four rates of commercial N and P fertilizers were applied to assess corn response when manure was not applied and response to supplemental N and P when manure was applied. Fertilizers were applied at rates from 0 to 150 lb of N or P_2O_5/acre. Corn yield and many soil and plant properties were measured in strips and plot areas.

This year's work was successful at reaching producers, manure applicators, and manure brokers to discuss issues relevant to manure sampling and utilization of nutrients. The reactions from every cooperator confirmed the great need for this project. Not all chemical analyses and data management have been completed, and only tentative and preliminary conclusions can be drawn from one-year partial results. In spite of high variability of poultry manure, the results showed that reasonable precision in manure nutrient application rates is possible by using manure nutrient analysis and careful spreader calibration. The average corn yield response to manure application across fields was 17 and 28 bu/acre for the low and high rates, respectively, but ranged from 3 to 53 bu /acre. Comparisons of soil and plant responses to manure and fertilizer N indicated that poultry manure N is not fully available in the year of application, although a specific figure cannot be provided from one-year results. Supplemental P fertilization did not increase grain yield in any field where either the low or high manure rates had been applied. At no field did fertilizer P produce higher corn yield, early growth, or early P uptake than manure even though high uniform fertilizer N and K rates were applied across the P plots. More sites and years are necessary to confirm first-year manure nutrient availability estimates.

Contact: Dr. Antonio Mallarino, 3216 Agronomy Hall, Ames, IA 50011, Tel: 515-294-9865, apmallar@iastate.edu

Nutrient Utilization of Composted Swine Manure and Bedding
Iowa State University

According to a recent survey conducted by Mark Honeyman, Associate Professor, Animal Science, Iowa State University, and reported in the 2001 Iowa State University Swine Research Report, it is estimated that there are 2,100 hoop structures used for swine production in Iowa. Approximately 90% of the hoops are used for feeding market pigs and the remaining 10% are used for housing gestating sows. It was estimated there were 768 producers in Iowa with hoops for swine. Approximately 50% of the producers use composting of manure and 40% composted swine mortalities. In the area surrounding Washington and Johnson Counties there are about 350 hoop buildings. This represents about 200 producers.

There is potential for over-application of nutrients in composted swine manure, because the nutrients are concentrated as the manure/ biomass is composted. In many cases, these producers are not large enough to require a manure nutrient management plan, thus the need for educational demonstrations. This project demonstrated how to effectively utilize composted swine manure and reduce nutrient loss.

The objective of this demonstration project was to determine how to best utilize composted swine manure from hoop buildings being planted into corn. The bedding of choice in these buildings is some type of biomass such as corn stocks, straw, paper, or sawdust. This material when mixed with swine manure is quite easily composted.

The manure was tested for nutrient content monthly as it compost. This was used to determine how much, if any, nutrients are lost in the composting process. The soil was tested for NPK content. Late spring Nitrogen test and late season N test for corn was taken. Two rates of compost was applied and a check with three replications. There was a check plot, one rate following Nitrogen recommendations and a 2X rate. Because of the organic material in compost, two subplots had additional N to see if there was a crop yield response. All plots were replicated three times.

- Two producers conducted on farm demonstrations of composted swine manure from a hoop building. The bedding was cornstalks.
- One producer conducted an on farm demonstration of a mixture of cattle lot manure and swine open lot manure. This manure was taken direct for the lots and applied to the demonstration plots. The material was not intentionally composted, but composted to some extent because of the nature of an open lot and holding area.
- Kirkwood Community College participated as a cooperator to compost liquid swine manure and wood chips. The College had an abundant supply of wood chips from their horse arena.

Conclusions

The results form this demonstration were that fresh and composted hoop building swine manure had no significant difference in yield response. Adding more nitrogen to fresh manure had no response over composted swine manure. It appears that the “fresh” manure already had significant decomposition.

When composting wood chips and liquid hog manure there is a significant tie-up of nitrogen and a good response is seen when additional nitrogen is applied to the corn crop.

To calculate the available nitrogen for corn from a manure sample, figure that all the ammonia nitrate is available and about 1/3 of the total nitrogen.

A good rule of thumb is to apply 20 ton of hoop building manure and 60 – 90 pounds of additional nitrogen to each economic and environmental goals.

For more information, refer to the posted presentation entitled “Nutrient Utilization from Composed Swine Manure and Bedding in a Hoop Structure”.

This project demonstrated how to effectively utilize composted swine manure and reduce nutrient loss.

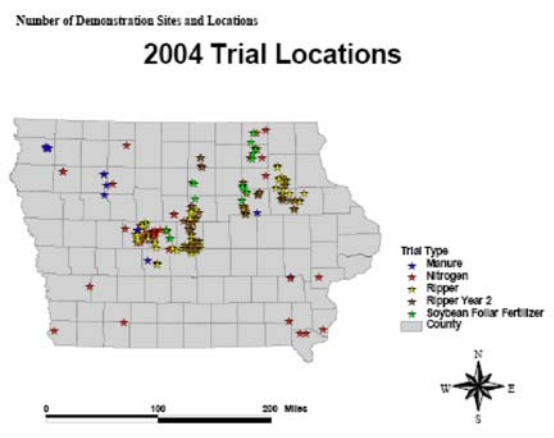
Contact: Terry L. Steinhart, 102 E. Washington, Sigourney, IA 52591, Tel: 641-622-2680, tsteinha@iastate.edu

On-Farm Network
Iowa Soybean Association

The Iowa Soybean Association has been proactive in demonstrating the use of tools and methodologies to evaluate improved management for both nutrient and tillage topics. Growers using GPS and yield monitors have put out replicated strip trials in a design that permits growers to make accurate field scale and within-field comparisons of two management practices. This is the fourth year of this program and fund from the IFLM program were used this year for demonstrating the evaluation of the following topics:

1. Evaluating N fertilizer rates in corn production
2. Evaluating products that affect N release or conversion
3. Evaluating N management relating to manure in corn production
4. Evaluating first and second year yield impacts of in-line ripping for corn and soybean production.
5. Foliar fertilization of soybeans.

Growers have put out replicated strip trials that permit them to make accurate field scale and within-field comparison of two management practices.



Number of Replicated Trials - 2004

Trial Type	Number of Trials
Manure	22
Nitrogen	72
Ripper	85
Ripper Year 2	41
Soybean Foliar Fertilizer	23

The final results are still being summarized but preliminary and updated results can be reviewed on the http://isafarmnet.com website as they progress.

Key points demonstrated at the time of this report:

1. Nitrogen fertilizer is best managed when considering factors other than yield goals. The loss and availability of N added and already in the soil were the most important factors. Growers who managed these factors produced optimal yields with low N rates in an above average spring rainfall year.
2. Foliar fertilization of soybeans as directed by the product companies did not increase profitability.
3. The vast majority of people doing the in-line ripping did not get a yield response significant enough to pay for the ripping. Of the areas that paid, it was the heavier soils. None of the second year crop (soybeans) showed benefit from the ripping.
4. None of the products used to retard availability or conversion of a fertilizer showed economic benefit.
5. Manure is a valuable source of nutrients when managed properly. When used incorrectly, significant increases of fertilizer were needed.

These evaluations have been incorporated with other programs including four watershed projects in Iowa. In addition, Environmental Quality Incentives Program (EQIP) eligibility was initiated for this strategy in some of Iowa's counties. The national Natural Resources Conservation Service (NRCS) Conservation Innovation Grant funded a $1,000,000 program that includes the same demonstration strategies for N management in corn.

In addition to extensive popular farm press and radio coverage, requests to speak at growers' meeting in both Iowa and other states continue to increase because of the success of the program. The increasing grower participation, the increased funding from many partners and the support of non-traditional groups such as Environmental Defense and The Nature Conservancy speaks strongly to the value of the program.

Contact: Dr. Tracy Blackmer, 4554 NW 114th St., Urbandale, IA 50322, Tel: 515-251-8640, tblackmer@iasoybeans.com

Producer-Oriented Tillage Demonstration
USDA-ARS National Soil Tilth Laboratory

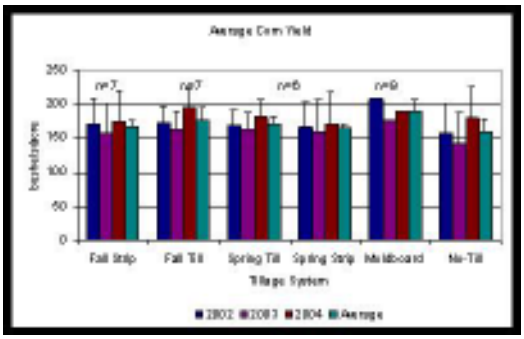
Tillage represents one of the critical components in a farming system and producers view tillage as a necessary process to prepare a seedbed, incorporate nutrients and pesticides, or control weeds. Reduction in tillage reduces erosion because of greater protection of the soil surface from the effects of wind and water; however, producers often view reduced tillage as increasing risk in crop yield due to pests, nutrient availability, or compaction. This study was designed to compare four tillage systems in both corn and soybean production on producer fields across Iowa to demonstrate that reduced tillage would not increase risk in crop yield. The four tillage systems selected in consultation with the cooperating producers were; fall-chisel (FT), fall-strip (FS), spring tillage (ST), and spring strip tillage at planting (SS). Both corn and soybean were planted on the tillage systems within the same field in order to provide a direct comparison of the rotation effect of the crops under the same tillage system within the same year.

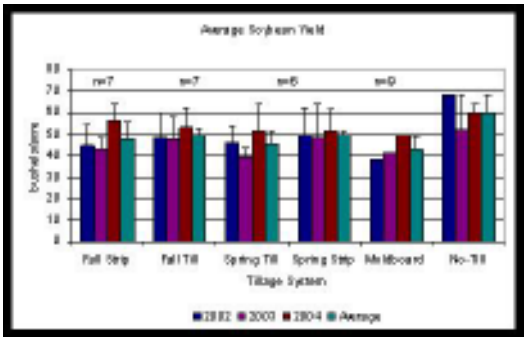
Data were collected sites around Iowa to address the following objectives: 1)Quantify the effect of four tillage practices on changes in soil properties; 2) Quantify the effect of four tillage practices on crop performance and economic return; 3) Quantify the response of local producers in each region to the study results; and 4) Evaluate the potential behavioral change in producers in each region in terms of changing tillage practices that will increase profit and improve environmental quality.

Additional questions were evaluated at an intense study site in Ames. These included the effect of tillage on the soil, interactions of tillage systems with corn hybrid and soybean cultivar performance, and a detailed documentation of the effect of fall-strip and spring-strip tillage on changes in soil temperature and soil water in the seed zone.

This project commenced with the 2002 cropping season, which represented the establishment year for most of the tillage plots. Prior to planting, a series of soil samples were collected at each site to document initial nutrient and organic matter distribution within the soil profile and a detailed set of samples collected at the end of the 2004 growing season. Samples were also collected after harvest each year to quantify the changes in the soil profile.

Crop yields varied among locations and years due to differences in the temperature and precipitation patterns during the growing season. Because of the variation in the weather during the first three years all producers recommended that an additional year of data collection be obtained and the study was extended through 2005 using no IFLM funds. Weather was more dominant than tillage practices within a given location; however, a general observation was that fall strip or spring strip practices created a more favorable environment than intense tillage. The trend was for these two practices to have the higher yields across all sites in the 2004 and 2005. Grain quality varied among tillage practices and years these data show that we can change grain quality in response to management and produce more consistent quality products.





The economic return and costs of the practices for all of the sites has shown that the breakeven yields of the different tillage systems are less for the fall strip and the spring strip systems. There is a consistent pattern for these practices to have a 5-10 bu/acre advantage in terms of yield required to recover production costs. Tillage can be reduced and these data bases assembled across the eight locations and four years will provide resource for producers to use in evaluating tillage systems.

Comparing four tillage systems demonstrates that reduced tillage will not increase risk in crop yield.

Contact: Dr. J. L. Hatfield, 2150 Pammel Dr., Ames, IA 50011, Tel: 515-294-5723, hatfield@nstl.gov

Strip Tillage Effects on Crop Production
Iowa State University

Corn and soybean are the main row crops in Iowa, and this state is the largest producer of these crops in the USA. In 2002, 17.7 and 28.6% of the area dedicated to corn and soybean respectively was under no tillage. Producers have concern about low soil temperatures, wet soil, and high soil strength under no tillage - particularly for corn production. To address this combination of concerns strip tillage has been used by selected innovative farmers for crop production.

To expand the awareness of Iowa farmers, strip tillage demonstrations were conducted in Jasper County near Newton, IA in 2004. Strip tillage corn and soybean yields were compared to those of no-till and chisel/disk systems for three different planting dates for each crop species. Soil water content and soil temperature was also monitored for each system during the spring preplant period.

The role that strip tillage plays will likely depend on soil type, topography and even presence of rocks in the plow layer.

Averaged across all treatments, corn yielded 231 bu/A in this very productive year. Corn yields were highest for the conventional tillage system (245 bu/A) across planting dates, followed by strip tillage (229 bu/A) and no-till (223 bu/A). This occurred even though row zone soil temperatures and soil water contents were equal between the conventional and strip tillage systems. Soil temperatures were lower and soil water content was higher for no-till soils. Soybean yields were essentially equal with all systems being separated by only 1 bu/A.

Farmers remain positive about strip tillage, although curiosity probably better characterizes their stance at the present time. Kevin Adams from Bremer County speaks highly of what the system offers, but also decided to quit using the system due to problems with rocks. Speaking with farmers, NRCS representatives, and cooperative managers in North Central Iowa strongly suggests a high interest and even a commitment to strip tillage exists in that area. The role that strip tillage plays will likely depend on soil type, topography and even presence of rocks in the plow layer.

Contact: Dr. Richard M. Cruse, 3212 Agronomy Hall, Ames, IA 50011, Tel: 515-294-7850, rmc@iastate.edu

Strip Till to Enhance Acceptance of No Till in Corn Production
Clay Soil & Water Conservation District

The Clay SWCD project involved the use of fall strip tillage as a practice to enhance the acceptance of no-till for corn production. Many producers acknowledge the value of no-till and soybean production but aren't willing to try no-till corn because of cold, wet soils. The clearing of a strip over the row will allow the soil to warm and eliminate the fear of planting in a no-till environment in the northern half of Iowa. The purpose of this project was to show that no-till corn is not only better for the environment but also more profitable to the producer. The ultimate result is that producers will change to a total no-till system, which will eliminate soil sediment and most nutrients as pollutants in our surface waters.

Three replicated strips of 24 rows each with 12 rows planted over the strip with no-tillage and 12 rows planted without strips using conventional tillage. Soil temps were, as expected, about five degrees warmer in the strips. The worked ground was a little cooler, probably due to the large amount of trash that was left in the field. The first and third of May we had frost, the corn was spiking, and the frost did not damage any of it. Emergence was pretty even, a little slower in the No-Till, but not real noticeable, maybe 1-2 days. Planting depth was very even through out all trials at about 1.75 inches even in the No-Till.

The 21st, 22nd, and 23rd brought 6 inches of rain. This rainfall reduced the stand especially in the plot which was in a lower area of the field that took a lot of runoff. It is estimated that this caused great loss of the surface applied 28%. This was evident because of the yellow corn prior to and during tasseling. The nitrate samples showed adequate nitrogen, which underscores the fact that these can be inaccurate. The nitrate sample in the strip till may have been high due to the nitrogen from the 18-46-0 applied last fall.

The rainfall and runoff reduced the stand and nitrate levels severely in this plot. It had signs of severe nitrogen deficiency and poor and erratic stands. The plot was in an area that took a lot of runoff. No difference could be seen between plots and the yields were somewhat surprising. There was no side-by-side with the strip still and the field cultivated half of the field. However, the transition could be clearly seen on the yield map.

All the information collected through this project will be available on the Clay SWCD website, www.theconservationstation.org

Questions about this project may be directed to the Natural Resources Conservation Service Spencer field office in the Clay Soil and Water Conservation District at the number listed below, or contact Pete Crew at 363-4430 or the Spencer Agronomy Service at 262-4391.

Once farmers are convinced that no-till works, they will change. Their bottom line will improve and air, water and soil will be enhanced.

Contact: Jerry Crew, Clay SWCD, 306-11th St., Spencer, IA 51301, Tel: 712-262-3432

IFLM Program Crop Year 2005

In Fiscal Year 2005, $850,000 was appropriated for the IFLM program. Six projects have been funded for Crop Year 2005, including demonstrations in over one-half of Iowa's counties. The following five projects will be continuing from previous crop years:

In-Season Nitrogen Management--ISU will demonstrate demonstrate the use of emerging in-season N application strategies through corn plan N status monitoring as a timing approach to allow for integration of seasonal N supplies differences into N rate recommendations.

Living Mulch Systems--ISU will compare a kura clover living mulch system to a traditional production system, to document reduced runoff and N availability to crops in living mulch, and will evaluate environmental and economic benefits of this alternative system.

Manure Phosphorus Management-- ISU will work with northeast Iowa dairy, swine and poultry producers to demonstrate the impact of manure applied at N-based and P-based rates on corn yield, soil test P and residual plant-available N.

The Iowa Learning Farm is the integration of agronomic, economic and community aspects in addressing water quality issues.

Nitrogen and Phosphorus Poultry Manure--Iowa crop and poultry producers will work with ISU to demonstrate manure sampling, assessment of N and P content based on chemical analyses, availability of manure N and P for crops, the importance of proper applicator calibration, and the effect of manure application on nutrient levels in soils and also on potential N and P losses with surface runoff.

On Farm Network--The ISA will help farmers conduct demonstration trials on their farms trials consisting of replicated, side-by-side, field-scale strip trials that allow farmers to evaluate alternative management practices. Throughout the growing season, various tests, tools and technologies are used to determine what has worked best in each field. At the end of the growing season, the Association helps farmers aggregate their data and offers interpretation of that data.

When the Planning Team began considering the structure and direction for implementation of the Integrated Farm and Livestock Management Demonstration Program in 2001, it was the consensus of the group that tillage and nutrient management were the key issues to address as they relate to soil conservation and water quality. It was agreed that the process would begin with competitive grants to establish smaller/regional scale projects. It was further agreed that the ultimate goal for the program would be establish a statewide demonstration project recognizing Iowa's diverse landscape.

In Crop Year 2005, this statewide project, the "Iowa Learning Farm", will be initiated through the collaborative effort of the Iowa Department of Agriculture and Land Stewardship, Natural Resources Conservation Service, Iowa Department of Natural Resources, Iowa State University Extension, Conservation Districts of Iowa, and Iowa Farm Bureau Federation.

What is done on the land affects soil and water resources, and the Iowa Learning Farm will address the challenges faced in managing natural resources and production systems. The project will:

- Focus on the improvement of water quality in Iowa through the implementation and promotion of conservation systems by engaging framers, agribusiness, and scientists in an active learning process. Additionally, the project will address the impaired water issue by utilizing existing water quality databases established by state and federal agencies over the past 10-20 years.
- Adopt a regional or site specific concept by dividing the state into five regions, each with a unique suite of management and conservation systems needs. The project team will work closely with 30-50 producers on their current systems and provide the technical expertise they need to fine tone their practices.
- Utilize a multifaceted approach in reaching a wide audience beyond participating producers.
- Promote new conservation programs such as the Conservation Security Program (CSP).

In conclusion, the Iowa Learning Farm approach is the integration of agronomic, economic, and community aspects in evaluating and promoting the effectiveness of conservation systems coupled with an extensive educational program in addressing state water quality issues. This unique and dynamic nature focuses on exchanging ideas between producers, agribusinesses, scientists, agencies and the public. The Iowa Learning Farm brings a new dimension for developing and transferring emerging technologies and fine tuning old ones that are community based, economically feasible and environmentally responsible.

Contact: Elaine J. Ilvess, IFLM Program Planner, Tel: 515-281-0531, elaine.ilvess@idals.state.ia.us